Implementing the NEDSS Base System in SC (CHESS): Lessons Learned

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NEDSS Base System = Carolina Health Electronic Surveillance System (CHESS):

- Focus on managing and decisions
- Opinions expressed are the authors'
- "The IT is the easy part." And it's not easy.

NEDSS Base System = (CHESS): Background

- In SC, county health departments are integrated with the state (DHEC)
  - Thus in NETSS era most reports were sent to state level first (many implications, e.g. re-sending to districts)
- Began NBS parallel testing May-June 2003 with all 53 Reportable diseases
- Began NBS (CHESS) production at state 7/03
- 6/12 districts now using CHESS, all 12 by 7/04
- ELR in two hospitals, parallel from Lab Corps

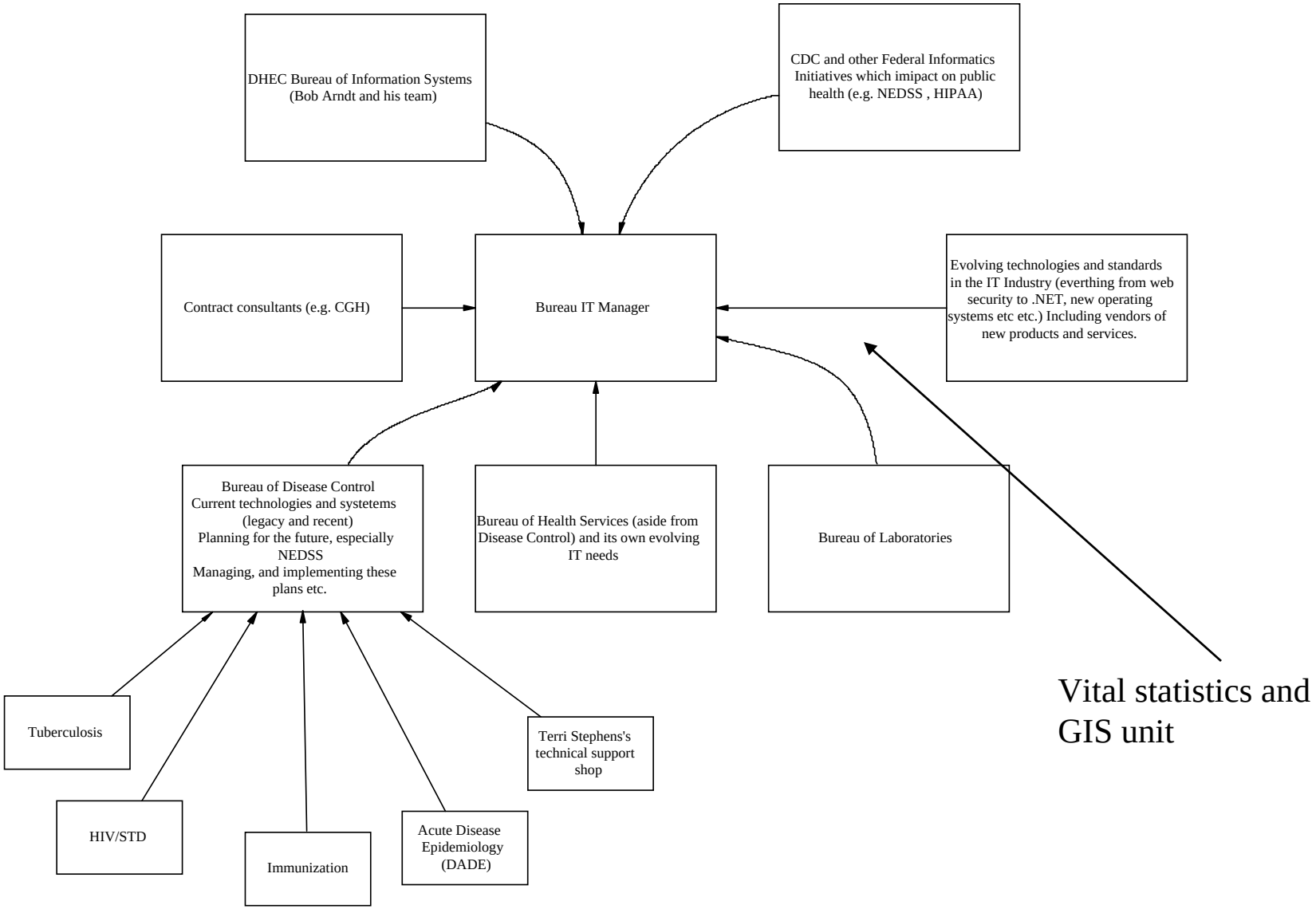
Implementing CHESS: Lessons Learned
Outline

- Things to do before you begin data modeling or writing code
- Staffing
- Implementing
  - Project Plan and Management
  - The contract
  - Data QA
  - Training
- Conclusions

Before you begin modeling, buying hardware or writing code: I

- Involve all significant stakeholders from the very start, then continuously and actively. TURF is a major and insidious enemy.
  - Regular meetings assure you don't let this slip
  - NEDSS is threatening because it is powerful, can affect many PH functions, costs $, has ongoing costs
  - Be ready to share resources
- Educate agency leaders up front and regularly – show what it will do for them
- Choose a catchy name and acronym: CHESS

Interested Party and Stakeholder Network for
the Bureau of Disease Control IT Manager

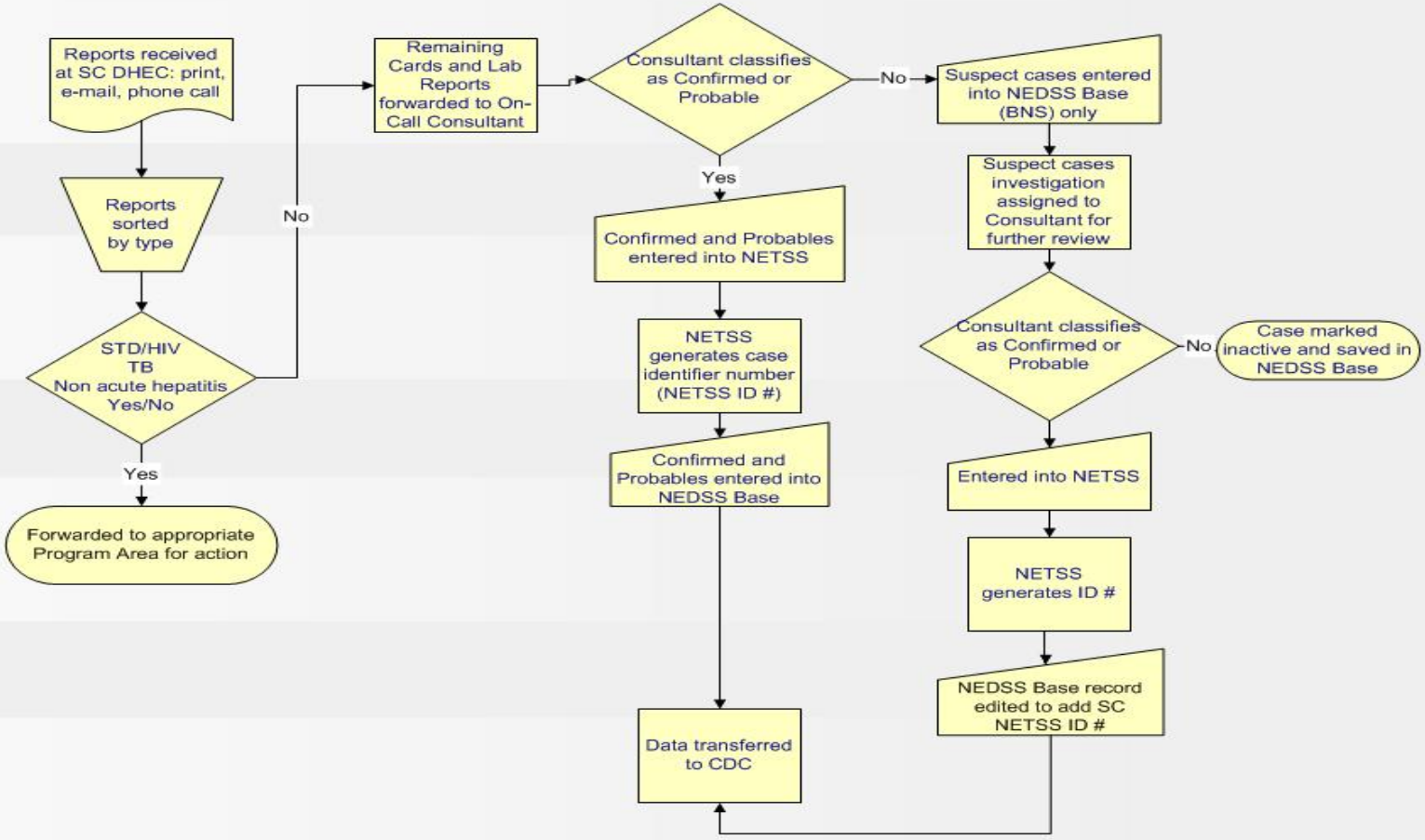


Before you begin modeling, buying software or writing code: II

- Very detailed assessment of state-level communicable surveillance business processes in painful detail. Then do it for a sample of your districts
  - By program staff with IT expert guidance
  - Seek variations from how "it's supposed to be"
- The product is a detailed statement of functional requirements = core of your contract with IT staff
- Make all possible decisions now; otherwise the IT contractor will make them, their way.
- Then re-analyze regularly – you keep learning what your business processes really are.
- Integrate all compatible systems!

Here is the **NBS ODR (operational data store) table structure.** 120+ tables, without counting the « system reference tables », the tables in the datamart, the tables in the RDB (reporting data base). You will become familiar with what complex relational data bases are all about!

Initial NBS/NETSS Process Flow



Before you begin modeling, buying hardware or writing code: III

- Define who is in charge, and disseminate that
  - Program person with IT expertise (or a compatible pair with those skills) and project management skills
  - Must work for health department, not contractor
  - Must devote enough time
- Finances: define where the money comes from, for at least 3 years
  - Determine agency procurement processes to be used
  - Estimate all costs: include training, maintenance, tech support, data entry, unexpected problems and delays, upgrades, security architecture and hardware
- Once “finished,” do major update Q 6-12 months

Before you begin modeling, buying hardware or writing code: IV

- Choose a contractor for the IT work
  - Many guides, e.g."Getting the most for the least" (ASTHO)
  - State government or agency IT group, or private sector
  - Consider: Hiring flexibility, keeping control, depth of technical skills, track record (ask, then make a lot of calls to verify their performance claims)
- If choose a system already built (e.g. NBS) verify compatibility with agency systems scrupulously
- Verify that IT builder will be around, and system maintained

Staffing

- Find an skilled project manager with IT experience. Make sure they are in charge.
- Empower to deal with political and turf rivalries.
- Build your own IT capacity in-house. Hire surveillance unit's IT staff in parallel with contractor. You must manage the data and understand what the contractor is saying.
- CDC-recommended NBS positions are approximate: DBA, Network admin.=less time; add a Data Manager

In fact, here is a room-full of IT folks all working on NEDSS related projects

Besides, who's responsible for all this stuff?

Implementation I

- Use an organized, deliberate project management process.
  - Project plan with milestones with deliverables
  - Formal user testing (districts!) at each step
  - Best way is to pay on delivery of each deliverable on time: but uncertainty in delivery of outside software makes this impossible.
- Managing uncertainty: NBS update delivery, bugs, design flaws, getting CSC attention, funding
- Have some smaller add-on projects to work on while waiting for key NBS deliveries: IR, TBCIS

Implementation: “Rational Software Development” = Project Management Life Cycle

- Stakeholder commitment
- Requirements development (continuing process)
- Design phase (physical data model, process flow)
- Construction
- Formal Testing by users
- Dissemination (training!!)

Matrix Management in a Health Department: How to make cross-cutting teams work

Organizational Units

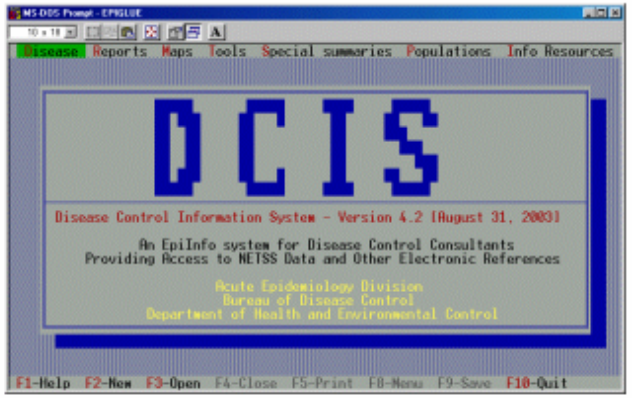
Team	Dis-ease Epi	Con-trac-tor	Dis-trict	Lab	HIV STD	Info Sys-tems	Imm-uniz	V.S.	Envir-on-mental
NED-SS	x	x	x	x	x	x		x	
BT B	x		x	x		x	x		x
BT HR-SA	x		x			x			x

Each “horizontal” team must be accountable and have authority in both directions.

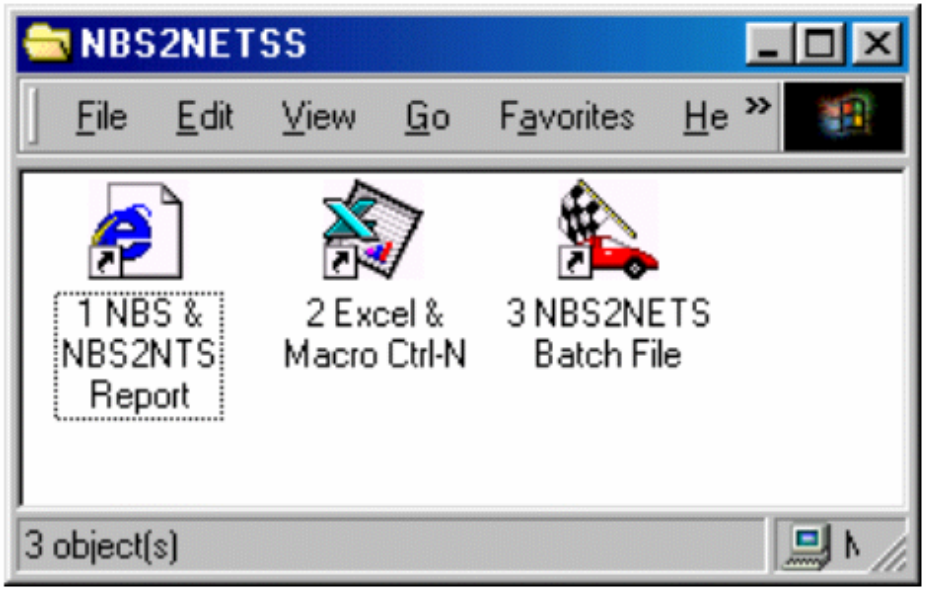
Just two of the NBS system projects resulting from joint Department of Health and CGH collaboration

Example of a Design Problem in NBS v1.1.2
No analysis capacity

The problem…



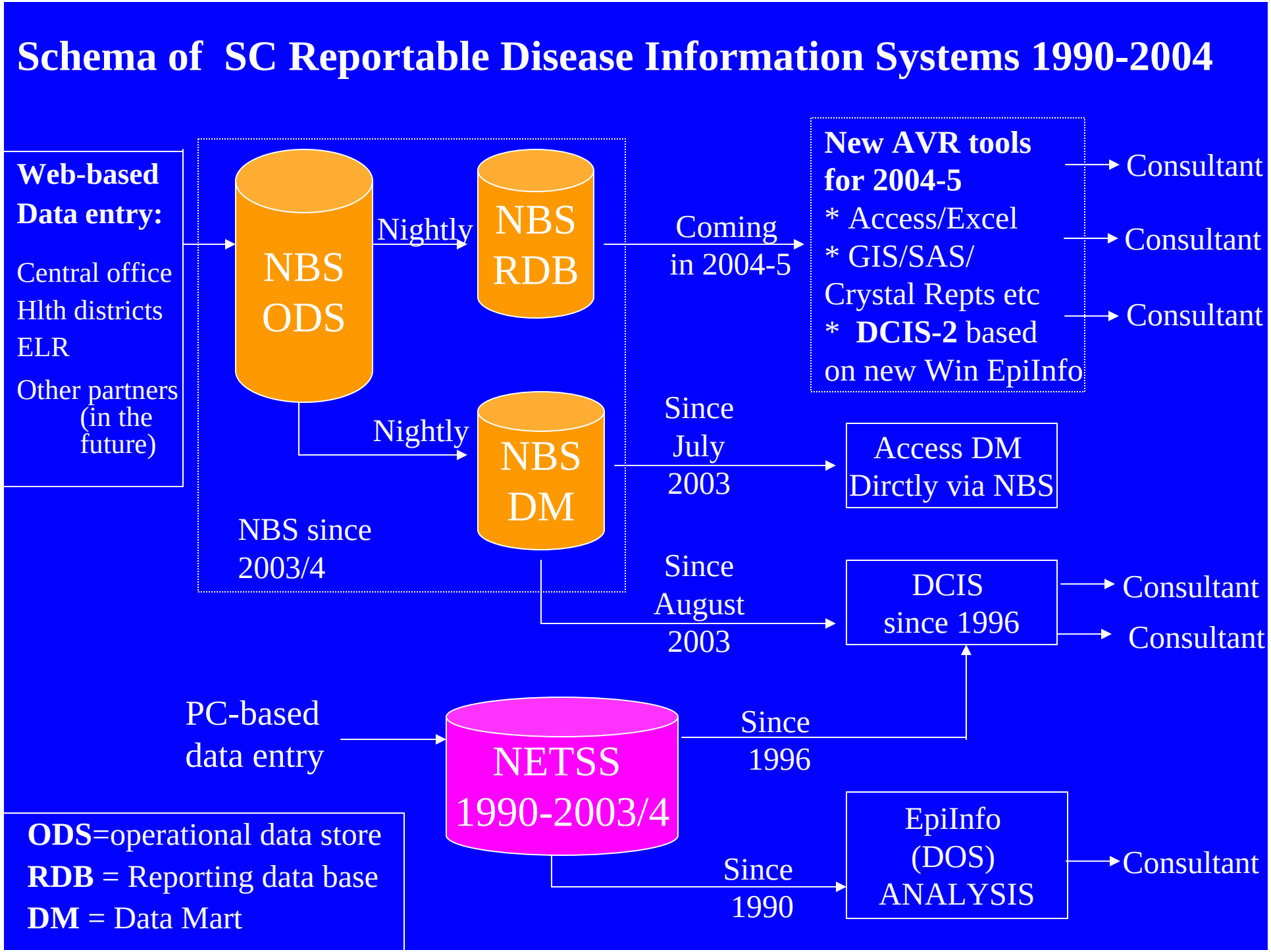
The solution…



Implementation II

- The Contract: Keep control of the process!
  - Plan with milestones and formal user testing & signoff
  - Written questions and tracking of responses
  - Interests of the contractor are not exactly the same as yours, e.g. maximize work. Even for best contractors
  - Analyze additions to project scope very carefully
- QA of data entry and "investigations"
  - During the transition period you are running multiple parallel systems, and data gets confounded

Schema of SC Reportable Disease Information Systems 1990-2004



Implementation III

- Use back-up and parallel systems to manage crashes
  - Development, training, production, back-up servers
- NBS roll-out is tricky: 4 phases
  - Parallel data entry and management during testing
  - Parallel operation of old NETSS (Salmonella etc) and NBS, and for data **reporting**
  - Roll-out and training to local health departments
  - Roll-out and training to provider users (ICP, EDs, labs
- You need a training Plan

Instances when all or part of the NBS has (temporarily) been "down"

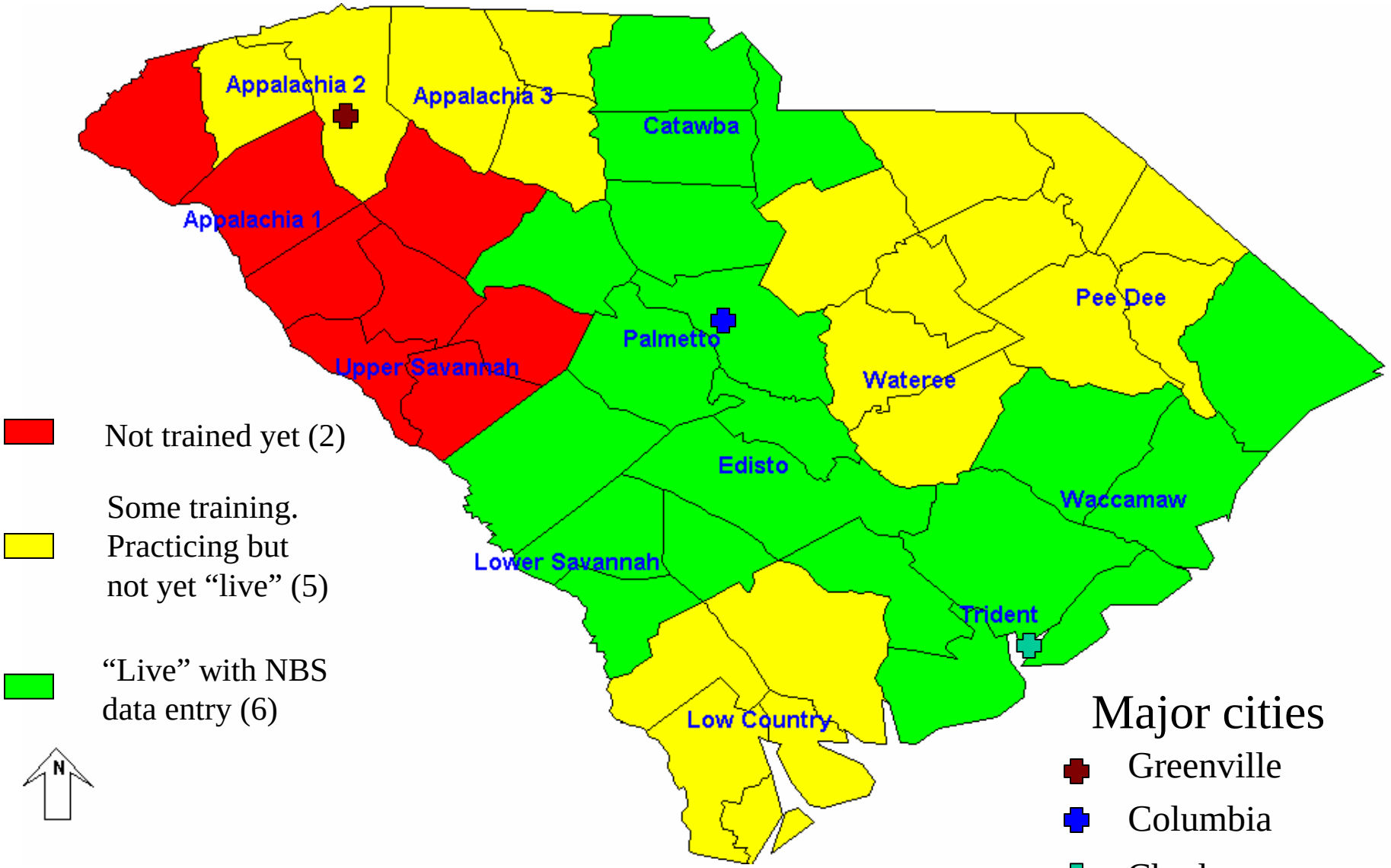
- January 2004: the NBS SAS license expires. NBS report capability is temporarily lost.
- Early 2004: the SC DHEC digital certificate expires. Ability to transmit data to CDC is lost
- May 2004: Sasser worm strikes. The NBS servers come down.
- Server hardware crash during IR demonstration for senior management
- **Demonstrates ongoing need for expert support staff!**

Is this the hardware underpinning for the NBS?
No…. just the Development Server Stack

So, what's in a NBS stack, and just how many stacks are there in the SC configuration?

- Each stack has:
  - 1 application server
  - 1 data-base server
  - 1 web server
  - 1 messaging-server (not for the training stack)
- And the stacks are:
  - **1 production stack** (in the main DHEC building)
  - **1 testing stack** (in the Asylum)
  - **1 training stack** (in the asylum)
  - 1 development stack (at CGH offices)
  - **1 laptop** (runs all 4 servers in a single « box » for demos
  - **1 production off-site back-up stack** (coming soon… will be 5 miles away in a secure IT center)

NBS Status of SC DHEC's 13 Health Districts



Conclusions

- “The IT is the easy part, and it’s not easy.”
- Use organized, deliberate project management methods
- Communicate the vision to senior management
- Build a strong development team that the surveillance program controls
- Monitor data quality